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PUBLICATION OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES

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Publication of the Association of American Medical Colleges

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Survey of Women Physicians on Issues Relating to Pregnancy During a Medical Career

Sara Sinal, M.D., Patricia Weavil, M.D., and Martha G. Camp, Ph.D.

Abstract—Many women in medical training want to combine a family life and a career. Of major interest to these women is determining the most desirable time for pregnancy during their medical education and career. The results of a study on women physicians' timing of pregnancy are reported. A 53 percent response rate was obtained in a randomized national survey of women physicians who had completed residency training and were less than 50 years of age. Their first pregnancies (of which 77 percent were planned) occurred as follows: prior to medical school, 4 percent; during medical school, 7 percent; in first year as house officer, 11 percent; in other residency year, 32 percent; in fellowship year(s), 13 percent; in practice, 28 percent, on leave or other, 5 percent. Seventy percent of the respondents considered "after completion of residency" to be the best time to become pregnant. Sixty percent of the respondents' maternity leaves were six weeks or less in duration. Seventeen percent required some medical leave before delivery, although only 5 percent required more than eight weeks of medical leave. Only a third reported that their training or work sites had maternity leave policies. Ninety-one percent of the respondents reported satisfaction in their careers.

The proportion of U.S. medical school students who are women increased dramatically, from 8 percent to 32 percent, between 1965 and 1985 (1). Twenty-six percent of the training slots in residency programs are filled by women. Seven years ago one-third of the specialties had no women in training, but by 1985 only vascular surgery remained as an all-male residency program.

Many of the women in medicine want to combine family life with a career. A common concern of women medical students is the timing of pregnancies (2). They are concerned that pregnancy will cause significant interruptions in their careers and that a demanding career will prevent optimal nurturing of their children. Women also worry that delaying childbearing may result in infertility or pregnancy complications (3).

A 1984 American Medical Association (AMA) survey (4) of 400 women physicians found that almost 50 percent had had their first child during training and 25 percent had had a second child during training. The present study expands on the AMA study by obtaining information on pregnancy timing.

The work reported here was supported in part by a grant from the North Carolina United Way and the Bowman Gray School of Medicine.

Dr. Sinal is assistant professor of pediatrics, Dr. Weavil is instructor of pediatrics and director of the Physician Assistant Program, and Dr. Camp is associate professor of medical education, all at Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina.

Methods

The group surveyed was a national sample of 904 women physicians who had completed residency training, were less than 50 years of age, and were listed in the American Medical Association's Physician Masterfile. An initial sample of 9,000 names, randomized with respect to geographic area and age, was purchased from an AMA-approved vendor. A 10 percent sample was determined to be sufficient to allow statistically correct results at the 95 percent confidence level. A sample of 933 names was randomly selected by computer.

In the fall of 1985, those in the sample were mailed a questionnaire accompanied by a letter explaining the study. The questionnaire asked for basic demographic data and information about board certification, income, specialty choice, and practice patterns. The second part of the questionnaire concerned the timing of the first pregnancy, maternity leaves, and support systems during pregnancy and the child's infancy. The third section was concerned with satisfaction in career and in family and personal life. A final section asked the women to comment on or make recommendations regarding pregnancy timing during a medical career.

The authors conducted a pilot study of the questionnaire in early 1985 by administering it to 40 women physicians from the Winston-Salem, North Carolina, area. The questionnaire asked the women about all their pregnancies, and the results revealed that most of the desired information could be obtained by studying first pregnancies only.

The respondents' responses to the full-scale survey reported here were analyzed by use of the chi-square statistic.

Results

Of an initial mailing of 933 questionnaires, 29 were returned as undeliverable, leaving a sample size of 904. This initial mailing plus two follow-up mailings to nonrespondents resulted in a response rate of 53 percent. Of the 480 questionnaires returned, 474 were usable.

BACKGROUND DATA

Of the 474 respondents, 64 percent (303) had children of their own (that is, exclusive of adopted children), averaging 1.4 children; 36 percent (171) had no children of their own. Eleven of these 171 women had step children. The respondents ranged in age from 29 to 49 years, 35 percent were aged 29 to 34 years, 32 percent were 35 to 39 years, 20 percent were 40 to 44 years, and 13 percent were 45 to 49 years. The median age of all respondents was 38 years; women with children, 40 years; and women without children, 36 years. Seventy-two percent of all respondents were board-certified, while 74 percent of those with children and 70 percent of those without children were board-certified.

The respondents' incomes were rounded to the nearest thousand. The median personal income was $60,000, and median family income was $98,000 for all respondents. For those with children, median personal income was $59,000, and median family or household income was $102,000. For those without children, median personal income was $62,000, and median family income was $87,000.

Specialty choices are reported according to a system provided by the AMA Division of Survey and Data Resources. Under this system, 92 practice specialties are converted to nine major categories, including "other." Among the respondents reported on here, none of the individual specialties in the "other" category were equal to 5 percent of the entire sample. The respondents' specialty choices are shown in Table 1.

TABLE 1

Percentages of 474 Respondents and 424 Nonrespondents to a Survey of 904 Women Physicians Concerning Issues of Pregnancy During Medical Career Who Practiced in Each of Nine Categories of Specialties, 1985*

Specialty†	Respondents			Nonrespondents
	Total	With Children	Without Children	
Anesthesiology	6	7	6	7
General/family medicine	11	12	10	10
Internal medicine	21	17	26	21
Obstetrics and gynecology	8	8	9	7
Pediatrics	23	27	16	22
Psychiatry	10	11	9	7
Radiology	4	4	3	4
Surgery	3	3	4	3
Other	20	20	19	19

* Six of the 480 respondents returned incomplete, unusable questionnaires, leaving a total sample of 474.

† The categories are those devised by the Division of Survey and Data Resources of the American Medical Association. The specialties of nonrespondents were learned from the AMA Physician Masterfile. The percentages for each specialty do not total 100 because 32 respondents listed more than one specialty.

TABLE 2

Percentages of 474 Respondents to a Survey of 904 Women Physicians Concerning Issues of Pregnancy During Medical Career Who Reported Their Primary Professional Activity in Each of Nine Categories, 1985*

Activity	Total	With Children	Without Children
Primarily academic medicine	25	21	32
Office-based practice			
Solo private practice	22	24	21
Two-physician group practice	10	12	6
Group practice	21	23	16
Health maintenance organization	6	6	6
Military	1	1	2
Industrial	1	2	1
Public health	1	1	2
Other	11	10	14
No answer	1	2	0

* Percentages do not total 100 because of rounding.

The primary professional activities of the respondents are listed in Table 2. Fifty-nine percent were in office-based practice, and 25 percent were primarily in academic medicine. Those in academic medicine were in the following ranks: instructor, 22 percent; assistant professor, 54 percent; associate professor, 21 percent; full professor, 2.5 percent.

Background data on the age, specialty choice, and professional activity of the nonrespondents were available from the AMA Physician Masterfile. The nonrespondents were very similar to the respondents in age and specialty choice. The primary professional activity of respondents and nonrespondents was more difficult to compare, since the questionnaire used in the present study did not collect the data in the same way as the

AMA. However, the groups seem similar in that both 59 percent of the respondents and the nonrespondents listed office-based practice as their primary professional activity. The other nonrespondents listed hospital staff, 2.7 percent; teaching, 3 percent; research, 6 percent; administration, 1 percent; unclassified, 9 percent; and other 17 percent. It is not known how many of these would have answered "yes" to the question, "Are you primarily in academic medicine?" The percentage of the nonrespondents with children is not known; but two-thirds of the women in a 1984 AMA study (4) had children, and, therefore, the respondents are likely to be representative of women physicians in this regard.

PREGNANCY TIMING

Seventy-seven percent of the respondents planned their first pregnancy, and 85 percent of these first pregnancies occurred between the ages of 26 and 34 years (mean = 29 years).

Timing of the first pregnancy in the survey group was a major interest in this study. In order to gauge timing, the respondents indicated both the stage of their medical career at conception and during the child's first year of life. Responses for all pregnancies are summarized in Table 3. Although 56 percent became pregnant with their first child during their residency or fellowship, 40 percent were in practice during their child's first year of life, indicating that many of these pregnancies occurred near the end of residency or fellowship programs.

In response to the question regarding advice on pregnancy timing to other women in medical training, 203 respondents suggested a specific time. Nearly 70 percent suggested that the best time for the first pregnancy is after completion of the residency program. The least ideal times were prior to medical school and internship, each suggested by only 1 percent of the group. During medical school was favored by 6 percent and during residency exclusive of the internship by 23 percent. A comparison was made of the actual timing of the respondents with children and their suggested ideal timing to determine whether women tended to rate their own timing as best. Of those who were first pregnant prior to medical school, 6 percent suggested that as ideal; of those first pregnant during medical school, 9 percent; internship year, 2 percent; other residency years, 20 percent; fellowship year, 16 percent; and in practice, 45 percent. From those women who

TABLE 3

Percentages of 474 Respondents to a Survey of 904 Women Physicians on Issues of Pregnancy During Medical Career Who Conceived Their First Child and Had Responsibility for the First Year of the Child's Care at Different Stages of Their Medical Careers, 1985*

Stages	Conception	First Year
Prior to medical school	4	4
During medical school	7	4
During internship	11	6
During other years of residency	32	25
During fellowship year(s)	13	10
While in practice	28	40
While on leave	1	5
Other	4	6

did not mention a specific ideal time, the most frequent comment was that the stage of medical training was unimportant if good child care was available. Others mentioned the age of the physician as an important consideration for timing of pregnancy.

There was no statistically significant relationship between pregnancy timing and career choices or some of the traditional measures of success. For example, timing was not associated with medical specialty, type of practice (academic, private, military, or health maintenance organization), board certification, personal income, academic rank, or satisfaction with career or family.

MATERNITY AND MEDICAL LEAVES

Only 33 percent of the respondents reported that their training or work sites had maternity leave policies at the time of their first pregnancy. Sixty percent of the respondents with children took maternity leaves of six weeks or less. Overall, the duration of maternity leaves was as follows: 23 percent, one to three weeks; 40 percent, four to six weeks; 21 percent, seven weeks to three months; 9 percent, four to six months; 4 percent, seven to 12 months; and 2 percent, greater than 12 months.

Seventeen percent had health problems during pregnancy that required some medical leave. A majority of these medical leaves were short, but a small percentage (5 percent) of the respondents required leaves of greater than eight weeks. Again, pregnancy timing did not significantly affect the duration of maternity or medical leaves. As to the availability of less strenuous work hours during pregnancy, 16 percent reported that part-time schedules and 22 percent reported that flexible schedules were available in their training program or workplace.

SUPPORT

When asked how many pregnant women physicians they had personally known before becoming pregnant, 39 percent of the respondents reported none, 33 percent reported one or two, and 28 percent more than two.

Most respondents reported that their husbands were supportive. Specifically, 81 percent reported that their husbands were helpful at home during their pregnancy, 88 percent reported they were emotionally supportive during their pregnancy, 80 percent reported they were helpful at home during the child's first year of life, and 84 percent reported they were emotionally supportive during the child's first year of life. Little support was reported from training programs or workplace directors, as only 16 percent of the respondents reported their workplaces to be helpful during their pregnancy, 17 percent to be emotionally supportive, 12 percent to be helpful during the child's infancy, and 14 percent to be emotionally supportive during the child's infancy.

HOURS WORKED

The number of hours worked per week was significantly associated with the number of children ($p < .05$ by chi-square). Twenty percent of those without children worked less than 40 hours per week, whereas 29 percent of those with one child ($n = 92$), 34 percent of those with two children ($n = 152$), 28 percent of those with three children ($n = 46$), and 46 percent of those with four or more children ($n = 24$) reported working less than 40 hours per week. The respondents with children included the 11 women with stepchildren.

CAREER SATISFACTION

The respondents were asked to rate their satisfaction with their careers and with

their personal lives on a 4-point scale from very satisfied to very dissatisfied. The women were satisfied overall with their careers (33 percent=very satisfied, 58 percent=satisfied). There was no statistically significant difference in career satisfaction between those with and without children ($p = .78$ by chi-square); 91 percent of those with children and 90 percent of those without children were satisfied with their careers.

Fifty-eight percent of the women with children expressed satisfaction with the amount of time available for their children. There were significant differences between the two groups regarding satisfaction with time for spouse ($p < .005$ by chi-square) and with time for self ($p < .0001$ by chi-square). Of the women with children, 49 percent were satisfied with time for spouse and 35 percent with time for self, compared with those without children, of whom 65 percent were satisfied with time for spouse and 63 percent with time for self. The women working fewer than 20 hours per week were significantly more likely to be satisfied than those working more than 20 hours with time for children ($p < .0005$ by chi-square) and spouse ($p < .001$ by chi-square), but they reported lower career satisfaction ($p < .05$ by chi-square).

Discussion

In 1984, 85 percent of all U.S. women physicians in the 40–44 year age group had children (5). An equal percentage of women medical students want to have children, based on a survey (6) of 320 medical students in North Carolina, two-thirds of whom expected and 44 percent wanted to interrupt their careers for child-rearing. In both the present study and a 1984 AMA study (4), two-thirds of the women surveyed had at least one child, and about half of these mothers delivered a child during medical training. Seventy-seven percent of the women reported on in the present study planned their first pregnancy, a percentage identical to that reported in a study (7) of 56 pregnancies occurring over 10 years among residents of training programs affiliated with Harvard Medical School.

Many investigators feel that managing a medical career and a family takes an unusually high toll on women physicians (8, 9), as evidenced by their higher divorce rate and suicide rate compared with non-physician women. The peak incidence of impairment for women physicians coincides with the time of both early career development and childbearing (8). The biological imperative is that women must bear children during their reproductive years and someone, usually the mother, must be responsible for their needs (10). Taking time away from careers to nurture children is one of several reasons why many women may seem to be slower in developing their careers.

The number of first births for women aged 25–39 began to increase steadily in the 1970s, with the largest increases observed for women in their early 30s (11). During the period from 1975 to 1984, the birth rate for women in their early 30s rose 27 percent, while that for women aged 35–39 rose 17 percent (12). This trend has been closely tied to educational attainment by the mothers, as the rates of first births from women 30–34 years of age increased most for the best educated women (11). The women in the present study reflected this delay in first births, since 30 percent of those respondents with children had delayed their first pregnancy until age 30 or older. In a national study reported in 1974 (11), only 14 percent of married women aged 30–34 years had not yet had a first child, while in 1984 this figure was 23 percent.

As indicated by the timing of their planned pregnancies and their suggestions as to the best timing for pregnancy, the women in the present study favored the last years of the residency or fellowship and the early practice years as the best time for pregnancy. From their comments, it is clear that many women found pregnancy and their child's infancy to be a very stressful time. As one respondent commented, "No time is truly convenient for taking care of young children .... pregnancy was the easiest part .... any time can be improved by support at home and at work."

The present study is similar to the AMA (4) and Harvard (7) studies in which a majority of women physicians in training did not have maternity leave policies or flexible or part-time schedules available to them. Forty percent of the present respondents reported not even one role model of a pregnant physician. Many were pioneers at their institutions in negotiating their individual arrangements to accommodate pregnancy and early child care. Nevertheless, pregnancy timing per se appears not to correlate significantly with career choices, career success, or career satisfaction.

Women have pregnancies at less-than-ideal times for a variety of reasons, including age, family and/or religious preferences, health, and contraceptive failure. A typical comment was, "Having a child during residency makes life significantly more complicated, but considering my age I couldn't wait later to have my first child." While maternity leave policies, role models, and creative scheduling arrangements are important for all women (7, 10), they are especially helpful to women who are pregnant during the least ideal times.

The effect of pregnancy timing and short maternity leaves on breast feeding, the maternal-child relationship, and the ultimate well-being of the children has been looked at only briefly (13) and is an area that needs further study. One of the respondents brought to attention another issue of concern when she wrote, "One should have the foresight to expect that, if engaged in a full-time job including a call schedule, time at home with children will be very limited. I don't think I truly understood that, prior to having children." In fact, knowledge of the time and attention necessary for good parenting may not be appreciated by many in medical training, particularly women without mother-physician role models. Women also may experience unanticipated contentment with their children, causing for the first time some ambivalence about their careers (14). The data in the study reported here demonstrated that part-time hours were associated with increased satisfaction with time for child and spouse but with decreased career satisfaction. This finding is an example of the difficulty women experience in balancing career and family life. Elective courses or seminars on combining parenting and professionalism, as described (8) at the New Jersey Medical School of the University of Medicine and Dentistry of New Jersey, may be of real value to those considering the dual roles of doctor and parent.

The information derived from the study reported here should be of interest to women considering pregnancy during medical training and to those responsible for supervising and directing women in their medical careers. Increasing numbers of women in medical training will necessitate the development of policies, support, and education directed to women physicians who wish to coordinate career and pregnancy, and this study contains information on these issues.

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Study of Teaching Residents How To Teach
Janine C. Edwards, Grace E. Kissling, Julie R. Brannan, Warren C. Plauché, and Robert L. Marier

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Instruction in Research-Related Topics In U.S. and Canadian Medical Schools

James R. Springer, Ed.D., and Lawrence J. Baer, Ph.D.

Abstract—The authors conducted a study to collect information on the teaching of research-related topics at medical schools. A questionnaire was developed and mailed to appropriate administrators of all accredited United States, Canadian, and Puerto Rican medical schools that asked for information on courses offered in epidemiology, statistics, evaluation of medical literature, and research design. Ninety-seven percent of the medical schools responded to the questionnaire. All but one of the 139 respondents reported offering formal instruction in at least one of the four topics; epidemiology and statistics were offered by 98 percent and 96 percent, respectively, of the responding schools. Training in evaluating medical literature was required by slightly less than half of the responding schools, and research methodology was required by one-third. Future studies should evaluate the effectiveness of such courses.

Teaching research-related topics to medical students has been widely accepted and endorsed by medical educators, researchers, and administrators. The 1984 report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine (the GPEP report) recommended, "Faculties should assist students in the development of their abilities to apply the rules of evidence and the law of logic to clinical, investigative, and published data in order to estimate the validity, reliability, and utility of those data" (1). This recommendation demonstrates the nationwide consensus supporting the importance of these topics. This report also recommended, "Faculty should cultivate the critical appraisal skills of medical students by more clearly defining and requiring their participation in research projects, journal clubs, Socratic sessions, and clinical teaching rounds that frequently pose the question, 'How good is the evidence for that?'"

Knowledge of and ability to perform research are increasingly important in graduate medical education. For example, the section on research in the "Special Requirements for Residency Training in Orthopedic Surgery" issued by the Accreditation Council for Graduate Medical Education (ACGME) for 1987–88 stated: "Residents must develop competence in critical assessment of new medical therapies and of medical literature. Residents must learn the design and interpretation of research studies . . . . faculty expertise

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and time must be available to stimulate and supervise resident research. Research productivity for residents and faculty must be documented" (2). This wording is a significant change from the 1984 ACGME statement on research in orthopaedics, which stated in total: "Reasonable facilities for research by the residents should be provided. Research activities should be documented" (3). Other specialties have also increased emphasis on research activities by "strongly recommending" rather than merely "recommending" research (2, 3).

The importance of practicing physicians' developing and maintaining critical appraisal and research skills is evident in continuing medical education trends. In reviewing self-directed learning among physicians, Richards (4) found that physicians cited reading professional literature as the most frequent and most valuable method they used in continuing their professional learning (4). Lifelong learning for physicians requires, then, that they have the ability to read professional literature critically (5).

In spite of the increasing emphasis being placed upon the learning, use, and documentation of research skills for medical students, residents, and practicing physicians, there is evidence that recent efforts to educate these populations have not succeeded. The GPEP report concluded, "Medical students are deficient in their ability to evaluate critically clinical and scientific evidence" (1). In addition, Berwick and colleagues (6) examined the performance of medical students, house staff members, practicing physicians, and academic physicians in coping with quantitative data and drawing inferences from it. They concluded, "Important problems exist in the consumption of quantitative information by medically trained individuals." Neame and Powis (7) attributed the problem to flaws in medical schools' curricula, which failed to introduce students to published medical literature in an organized manner and failed to teach students how to read literature critically.

In the present study, the authors collected information on the teaching of research-related topics in North American medical schools.

Methods

The authors developed a questionnaire that asked for information on course offerings in epidemiology, statistics, evaluation of medical literature, and research design. These four areas were felt to encompass those research principles necessary for a well-based understanding of medicine and would also be needed by physicians to maintain competency in their rapidly changing profession. The questions asked whether these courses were elective or required and taught as separate subjects or formally integrated into other courses; who taught these subjects (that is, by full-time or part-time faculty members and by instructors with which academic degrees); the number of years the courses or topics had been offered; whether the school evaluated the instruction; and if these courses were not taught, why they were not taught.

In 1987 this questionnaire was sent, personally addressed, to the deans or other appropriate persons responsible for curricula at all 143 U.S., Canadian, and Puerto Rican medical schools listed in the *1987-88 AAMC Directory of American Education* (8). One or two follow-up letters and duplicate questionnaires were sent to the deans who did not respond.

The relationships between the size of the total enrollments at the medical schools, as reported by the deans' offices, and their course offerings were examined.

Results

The overall response rate was 97 percent (139 of 143 schools), and all the Canadian and Puerto Rican schools responded. All but one (99 percent) of the responding schools offered formal instruction in epidemiology, statistics, literature evaluation, and/or research methodology. Epidemiology and statistics were the most frequently offered, as shown in Table 1. Similarly, these two topics were most frequently required, with more than 80 percent of the responding schools requiring them. Training in evaluating medical literature was required by slightly less than one-half (44 percent) of the schools, and research methodology was required by one-third. The four topics were offered as specific courses at 40 percent to 63 percent of the medical schools and were integrated into other courses at another 31 percent to 35 percent.

For each of the four areas, instruction was usually offered during the first two years of medical school, as shown in Table 2. Almost 90 percent of the schools used instructors with M.D. or Ph.D. degrees for these courses; overall 34 percent used instructors who held both M.D. and Ph.D. degrees; and only 14 percent used instructors with master's degrees. Full-time faculty members taught the topics at 87 percent of the schools, and clinical faculty members taught them at 30 percent of the schools.

Ninety percent of the schools evaluated the effectiveness of their research-related courses. The median length of time during which these research-related subjects

TABLE 1

Percentages of 139 U.S. and Canadian Medical Schools Teaching Each of Four Research-Related Topics, by Category and Format of the Offering, 1987*

Topics	Category		Format		Offered in Any Form
	Required	Elective	Separate	Integrated	
Epidemiology	87	13	63	35	98
Statistics	83	8	62	34	96
Literature evaluation	44	24	42	35	78
Research methodology	31	35	40	31	72

* The deans of all 143 medical schools accredited by the Liaison Committee on Medical Education in the United States, Canada, and Puerto Rico were sent questionnaires; 139 responded.

TABLE 2

Percentages of 139 U.S. and Canadian Medical Schools Teaching Research-Related Topics at Each Curricular Year, 1987*

Topics	Year 1	Year 2	Year 3	Year 4
Epidemiology	44	53	10	15
Statistics	47	40	7	9
Literature evaluation	30	29	19	20
Research methodology	27	30	17	23

* The deans at all 143 medical schools accredited by the Liaison Committee on Medical Education in the United States, Puerto Rico, and Canada were sent questionnaires; 139 responded.

had been taught was 10.2 years; the range of reported lengths was 0 to 146 years.

The schools offering these research-related courses had slightly more students on average than the schools that did not. Those offering epidemiology, for example, had average enrollments of 515, while those that did not had an average of 420. The findings for the other three topics were: 516 for those offering statistics, 451 for those that did not; 524 for those offering literature evaluation, 476 for those that did not; and 520 for those offering research methodology, 497 for those that did not.

Discussion

Nearly all (99 percent) of the medical schools responding to the present study offered some form of instruction in epidemiology, statistics, research methodology, and/or literature evaluation. However, these topics have been offered for a median of only 10.2 years, and many schools do not offer courses in many of these subjects (Table 1). The most frequently cited reasons for not teaching these topics were lack of time in the curriculum and relative unimportance of these topics; other reasons given were student boredom with the topics, limited faculty skills to teach the subjects, and difficulty integrating the topics into the curriculum. The one school that did not teach any of the topics in any form felt that because no specific department was assigned responsibility for these areas, these subjects were not taught.

Epidemiology and statistics, those subjects with long histories and structured mathematical bases, were most frequently offered and required. This finding may be due to the relative ease in obtaining textbooks and materials and faculty members with degrees in the subjects. Research methodology and literature evaluation, conversely, are areas for which teaching materials are not readily available and are areas so broad in scope as to make course design difficult. Also, adequately trained and experienced instructors for these two areas may not be available. One responding dean cited this problem as the reason for not teaching research methodology and literature evaluation. In addition, it may be that medical school faculties assume that entering medical students have gained sufficient training in research methodology and design.

Although the medical schools that offered these courses tended to have more students, this difference did not seem significant, with a maximum difference in average class size of 24.

The research-related topics were usually presented during the first two years of medical school, ideally the time to build basic knowledge. The finding that the topics are less often taught in the third and fourth years may imply that most schools fail to reinforce their earlier instruction. The authors' personal experience has indicated that once students are made aware of the importance of these research-related areas, they often express a desire for a four-year sequence of teaching in these topics. Such a sequence could begin with an introduction to statistics, research design, and epidemiology and continue with frequent reinforcement through practical application during clinical training.

The extremely high response rate attained in this study (97 percent) indicates that these data represent the status of research-related instruction in all accredited U.S., Canadian, and Puerto Rican medical schools. This high response rate may be a measure of the importance and interest in this topic to medical educators.

Implications

While the data reported here imply that medical schools, collectively, are meeting the need for research-related training described in the GPEP report, other authors (6, 7) have provided disquieting information on the ineffectiveness of this training. Studies should evaluate the effectiveness of the courses offered. Ideally, these studies would follow medical students from their initial experiences in research through residency training and in medical practice. Results of such studies could be used to evaluate the effectiveness of the most common method physicians use in the self-directed learning—reading and evaluating published medical material.

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